Mobility and transport resilience :
Lausanne's urban transport under the covid-19 pandemic

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Urban Mobility and Transport
Student: Clarisse PROTAT
Personal work

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Introduction

Lausanne is located on a plain dotted with hills that were once morainic deposits left by the Rhône glacier during the Ice Age. This area is held to the north by the extension of the large lateral moraine of the Flon, which structures Lausanne from east to west, and by the large frontal moraine of the Motty, which rises from Renens to Lake Geneva. This plain is the place where the Romans established the first site of the city of Lausanne in 15 BC.

Through history, mobility in Lausanne has been built, and is still being built, on this very particular topography. This constitutes a daily difficulty. From the beginning of 2020, another difficulty was added: the Covid epidemic. This pandemic weakened the mobility networks in place and the local authorities were therefore faced a double challenge.

How did Lausanne manage to develop its transport system despite its particular topography, and how did this transport system adapt to the health crisis of covid ?

We will first see how the Lausanne transport system is resilient to the singularities of the territory. Then we will see how it is resilient to a major health crisis. In this second point, we will develop the example of the university campus of Lausanne.

Source : https://actu.epfl.ch/

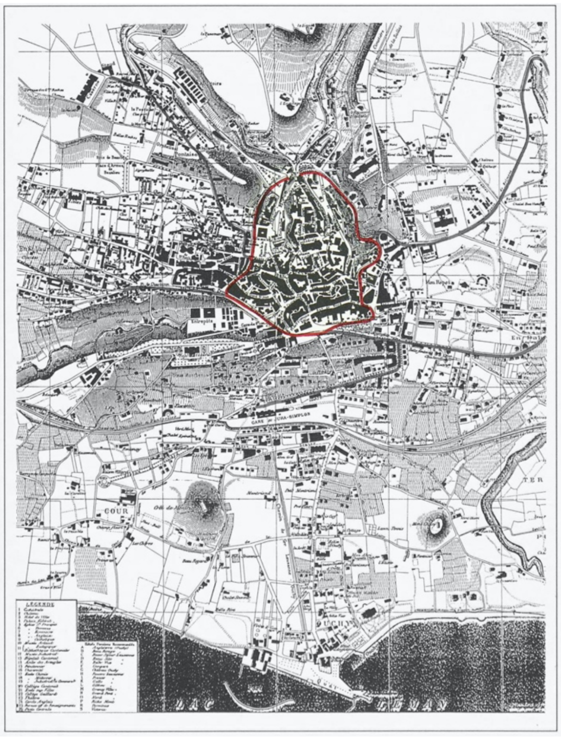
I. Mobility and specific geomorphology

1. The historical traffic route

The relief in Lausanne has strongly influenced the settlements. Very schematically, the city is structured at the front with expensive housing taking advantage of the view, and at the back are the infrastructures and large housing estates that sometimes look out over the hills. This logical division has created divisions within the city, particularly during the construction of infrastructures such as the Pichard Belt which, in the middle of the 19th century, formed a plan to link the hills within Lausanne.

"The construction of this Pichard Plan was to reshape the whole organisation of the city. Even today, Lausanne's collective memory is structured by this dividing plane. For the social groups play with the relief in very different ways above and below the Pichard Belt."
Cache, 1997[1]

Like the Pichard Beltway, an other major traffic organises the city that surrounds it : the Lausanne-South motorway. This traffic lane has the advantage of being in the hollow of the hills. Rethought with less speed, it could reorganise the city that surrounds it, as the beltway does today with the old town. But despite this "Pichard Belt" effect, there is still an omnipresence of the car in the city center, both in terms of traffic and transit and in terms of surface parking.



Lausanne and the Pichard Belt (in red), 1988
Source : Swiss Engineers and Architects, urbanism review, N°20, September 1988

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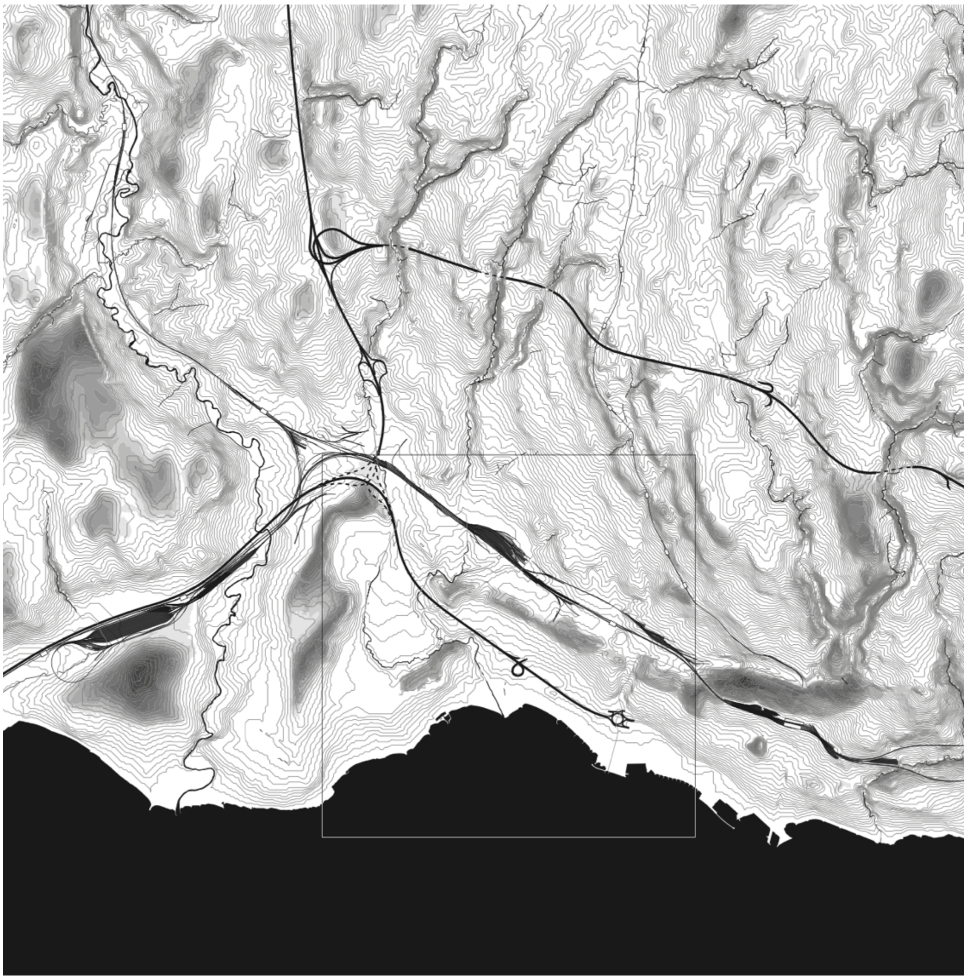
[1] B. Cache, Terre meuble, Orléans, D'autres projets pour le domaine de Dorigny, 1997

2. The modernization of road infrastructure

It was not until the 1960s that Lausanne decided to catch up and embrace modernity. Thanks to the opportunity offered by the 1964 national exhibition that the city was greatly transformed, mostly with the construction of a motorway route. This South-Lausanne motorway connects the lake (where huge exhibition site was built) and the the Swiss motorway network.

Several visions on a territorial scale were studied at the end of the 1950s to finally respond to the "sincere need for grandeur" that Switzerland and the city of Lausanne needed at the dawn of this exhibition. Half of Lausanne was under construction at that time. The work is modifying a huge part of the soil around the motorway route, the soil in Malley is turned over, the river Flon is covered up to its mouth in Geneva, where a huge area is reclaimed from the lake. After the exhibition, the territory will take time to recover from these transformations, which have severely transformed the permeability and the ecosystem.

In this race for modernity, we can also mention the Lausanne-Ecublens international airport project, which was to be built on the current EPFL site. But this project has been very strongly rejected by the Vaud population for fear of noise pollution.



Lausanne and the motorway (in black)
Source : Clément Cattin, 2019

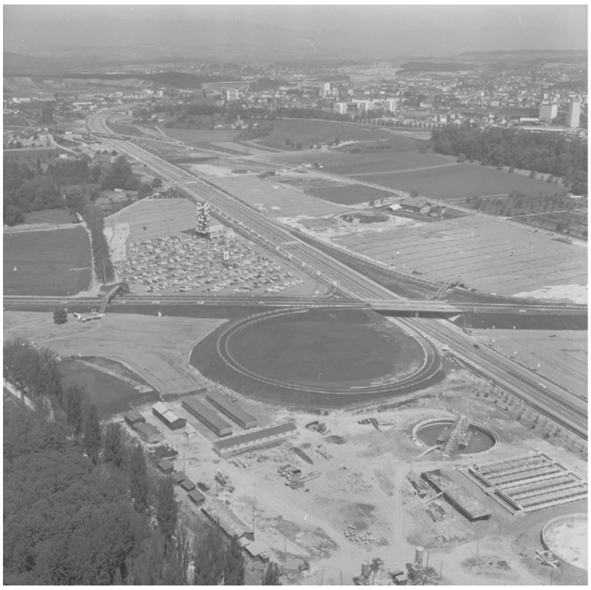
3. The impact of transportation modernization

Throughout history, Lausanne has taken advantage of fertile plains, a lake and the crossroads of major trade routes for its development. Its famous topography, presents as many challenges (accessibility, orientation, etc.) as it does assets (quality of views, character, etc.). However, in the race to modernise transport, the city has not always respected the specificity of its territory and its fragility.

Today, the area suffers from traffic pollution and the traffic jams that form on this axis morning and evening. The noise and the scale of the roads do not favour the development of the city in this area either. It is therefore necessary to reflect on the future of this land, which was built at the time to adapt Lausanne to modernity, but which today faces other challenges.

One would hope that the city of Lausanne would develop projects that would rethink this road infrastructure. And which would envisage the land around it as something other than an infrastructural void. A real conception of land recycling is needed to frame the landscape characteristics of the site while making it more habitable and articulated for soft mobility for example.

The motorway that runs through the gardens
Source : Clément Cattin



The huge parking areas at the 1964 exhibition
Source : Mandelmann Erling

II. Mobility and the impacts of lock down measures

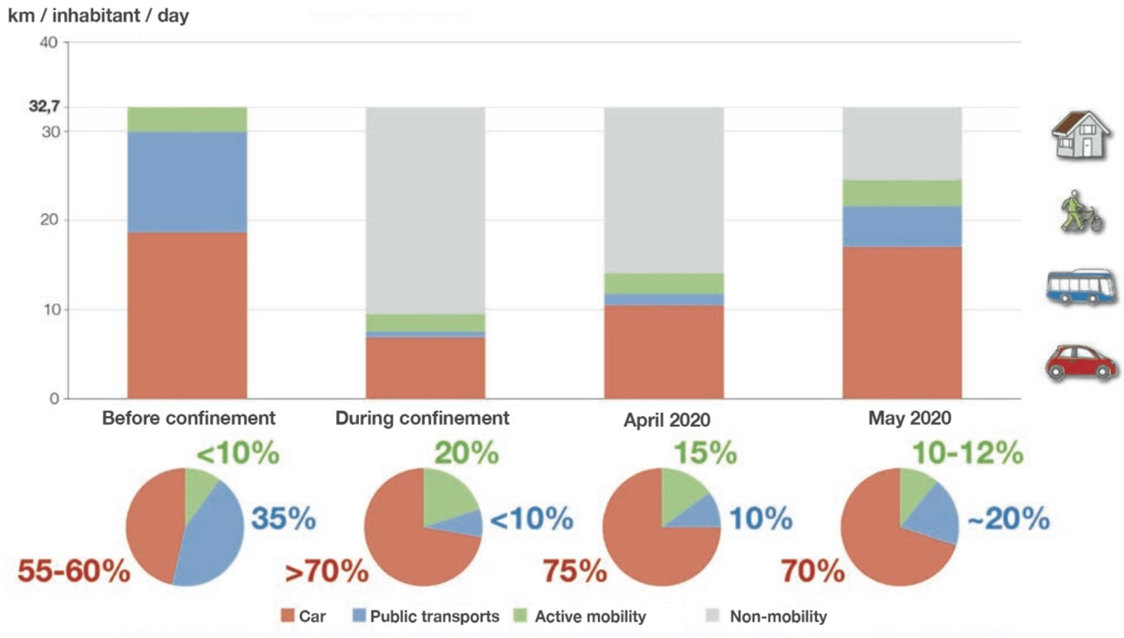
1. The impact on motorization

Switzerland, which had a particularly detailed "pandemic plan" before the start of the crisis, nevertheless demonstrated that it was no better prepared to deal with the epidemic than the other European states. Drastic containment measures had to be taken as everywhere in Europe. As a result, there was much less movement of people, and as soon as the first measures were put in place, a significant reduction in road traffic.

The time of use of the private car, as well as the type of private car used, has changed a lot between 2020 and 2021. Lausanne's passenger car fleet comprises 48,391 cars in 2021[2]. The number of petrol and diesel cars is decreasing, while the number of electric cars and cars using other types of fuel (including hybrids) is increasing.

A general decrease in traffic was thus observed during the containment period in the city of Lausanne. This reduction in traffic has had many benefits. The ones that seem to have been perceived by the inhabitants are the significant reduction of noise pollution. But we can also mention the reduction of air pollution levels during the whole covid period.

However, during the first weeks of deconfinement, the municipality observed a change in travel practices with a strong increase in the modal share of the car. The city therefore wanted to propose public transportation measures in order to avoid a modal shift to individual motorised transport.



Mobility of a Lausanne inhabitant during the Covid
Source : Monitorage de la mobilité en lien avec le Covid-19, Une approche de la mobilité des Vaudois en lien avec la crise du Covid-19, 2020

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[2] Observatoire de la mobilité lausannoise, Indicateurs de suivi de la mobilité, Edition 2022

2. The impact on public transport

On the one hand, the inhabitants of Lausanne drastically reduced their use of public transport during the first period of the Covid. While 2020 saw a drastic decrease in the use of public transport (down to less than 20%) in the days following the declaration of the "extraordinary situation" on 16 March 2020, 2021, although still lower overall than the 2019 baseline, shows more stable weekly ridership[3].

On the other hand, tourists, important users of the public transport network, were very rare during the whole Covid period. Swiss cities, hosts of business tourism and congresses, have been fully impacted by the covid restrictions. In Lausanne, the number of overnight stays collapsed from March 2020. The fall in visitor numbers exceeded 90% in April 2020 with the virtual disappearance of foreign visitors. This has resulted in emptied the city's roads and public spaces.

3. The impact on active mobility

First of all, during Covid there was a general increase in the use of bicycles, especially in the city centre. According to the 2022 report of the Lausanne Mobility Observatory[4], almost half of the population of Lausanne owns at least one conventional bicycle (47%). If electric bicycles are added, 54% of the population of Lausanne lives in a household that owns at least one bicycle.

Then, the health situation has acted as a trend accelerator for active mobility. Indeed, the city of Lausanne had already initiated research into pedestrians, soft mobility and public spaces. A major citizens' consultation phase was launched to gather the views of the inhabitants. This leads to some confirmations in terms of appropriation of public spaces : under-representation of women, senior citizens and children in the public spaces surveyed.

These surveys of inhabitants carried out during the covid have made it possible to move away from an "all-mobility" vision of public spaces. The squares are perceived more as logistical transport platforms and not enough as leisure spaces. Small-scale experiments in the development of public space have also been carried out with the inhabitants.

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[3] Observatoire de la mobilité lausannoise, Indicateurs de suivi de la mobilité, Edition 2022

[4] Suivi de la mobilité Covid-19, Office de la statistique du canton de Zurich, Swiss National COVID-19 Science Task Force, KOF Centre de recherches conjoncturelles de l'École polytechnique fédérale de Zurich (EPFZ), Institut de recherche intervista AG, 2021

III. Mobility and resilience to the covid crisis

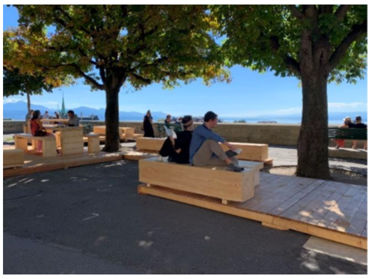
1. The innovative temporary solutions

In 2020, in the midst of the Covid epidemic, the city of Lausanne reserve certain lake's quays to active mobility. These are the Quai de Belgique and the Quai d'Ouchy. These quays are therefore free of all motorised traffic on weekends from May to September. This has made it possible to free up space so that residents can walk around safely. A survey conducted by the city in 2021 showed that a large majority of the population is in favour of this measure[5]. It is also perceived as an advantage for the restaurants located near the Place du Vieux-Port and for the attractiveness of their terraces.

As far as the extension of terraces is concerned, 175 requests were received by the city[6], of which almost two thirds were accepted. The extension of terraces will mostly take place outside the public domain or in pedestrian streets (50%). In other cases (25%), the extension will lead to the removal of two or three parking spaces.

In addition, the space generally reserved for the Lausanne market is not sufficient to meet safety standards. Several additional streets have been pedestrianised. This measure allows the market to spread out over a larger area and thus respect the health restrictions imposed by the Confederation. With that, temporary local experiments have been carried out, notably with the creation of pop-ups in public spaces. We could also mention the rehabilitation of balconies and belvederes.

Rue St-Martin: more space for bikes
Source : city of Lausanne



Viewpoint of the Cahthedral and temporary furniture
Source : city of Lausanne

A pop-up square in front of a primary school
Source : city of Lausanne

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[5] Monitorage de la mobilité en lien avec le Covid-19, Une approche de la mobilité des Vaudois en lien avec la crise du Covid-19, 2020

[6] Suivi de la mobilité Covid-19, Office de la statistique du canton de Zurich, Swiss National COVID-19 Science Task Force, KOF Centre de recherches conjoncturelles de l'École polytechnique fédérale de Zurich (EPFZ), Institut de recherche intervista AG, 2021

2. The permanent measures

Many Covid legislations have been made permanent.

Firstly, the municipality has decided to repeat the experiment of reserving quays to active mobility. The Lausanne authorities explain that "this initiative is part of the Municipality's desire to propose measures to open up public spaces while encouraging respect for physical distance by the people of Lausanne".

Secondly, the omnipresence of bicycles during the confinement has led the town hall to carry out many cycling facilities. Under the impulse of local cycling associations, in 2021, 4 km of bicycle facilities and links were built, including the creation of parking spaces reserved for bicycles.[7]

Thirdly, the reduction of road traffic during the covid and its benefits push the local authorities to pursue certain measures. The city of Lausanne is developing traffic zones limited to 30 km/h called "moderate zones" or 20 km/h called "encounter zones". The development of these moderate zones continued in the covid period between 2020 and 2021. During this period, one kilometre of zones became "moderate". These zones were reduced from a traffic speed of 50 km/h to 20 or 30 km/h.

In addition to these specific zones, a speed limit measure during the night has been applied to the whole city of Lausanne in 2021. This measure permits leads to a significant reduction of traffic-related nuisances, such as noise and pollution. This is the first time in Switzerland that a specific night time speed limit is applied. 60 speed indicators were installed in the city of Lausanne, in order to make road users aware of this new measure. According to Lausanne Mobility Observatory, few months after its implementation, the first results are positive.

The Quai d'Ouchy freed of all motorised traffic
Source : Jean-Christophe Bott

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[7] Observatoire de la mobilité lausannoise, Indicateurs de suivi de la mobilité, Edition 2022

3. The example of the Lausanne campus

The University of Lausanne is a university located in the countryside of Dorigny, in the canton of Vaud, Switzerland. With over 17,000 students from 86 different countries, the Lausanne campus is considered a city within a city. As mentioned, the campus is located in the countryside and very close to the lake. The campus need to adapts climate change and to interacts more and more with its immediate environment.

In the campus, there is in fact, differentiated traffic patterns on several levels linked by a network of walkways. The cars and public transport are at the ground level. The pedestrians are at the main level located on high ground, in the open air and sheltered from the rain. But today on the campus, there is a strong influence of the car.[8] This creates a discontinuity of footpaths but also a lack of soil permeability and low possibilities for biodiversity development. A survey of students[9] highlights also the disparate signage and insufficient lighting, discomfort and insecurity for users. This survey also shows that this is not adapted to people with reduced mobility.

The city of Lausanne has therefore organized a major sustainable urban planning project for the campus : “pedestrian campus project”. This project develops active mobility, vegetalisation and carbon control on the campus. The solutions that have so far emerged from this ongoing project are the elimination of individual vehicles from the heart of the campus and the dewatering of certain areas (gardens and wetland).

But the very important scientific research within the campus will also allow the development of innovative solutions in terms of mobility. We can mention vehicle automation (autonomous shuttles, drones), digitisation (vehicle connectivity and multi-service platforms), sharing solutions (vehicles and journeys) and multimodality. All this should be added to the first solutions already in place by 2050. Monitoring and awareness-raising tools for students will also be installed on the campus, such as a CO2 monitoring station.

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[8] P. Rérat, A campus on the move : Modal choices of students and staff at the University of Lausanne, Transportation Research Interdisciplinary Perspectives, Volume 12, 2021

[9] Environmental diagnosis and behavioural analysis lead by the EPFL laboratory Axesslab in 2019

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